

Abstract of Disclosure

Specific apparatus and associated methods are described for use in establishing the positions of locating field detectors and for path mapping within a region for the purpose of tracking and/or guiding the movement of an underground boring tool. In one aspect, an improvement is provided forming part of an arrangement for tracking the position and/or guiding the boring tool using an electromagnetic locating signal which is transmitted from the boring tool as the boring tool moves through the ground. At least two detectors are located at fixed positions within the region, each being operable in a transmit mode and in a receive mode such that each one of the detectors in the transmit mode is able to transmit a relative locating signal to the other detector for use in determining the relative position of one detector in relation to the other and such that both detectors receive the electromagnetic locating signal in the receive mode for use in determining the position of the boring tool within the region. Provisions are also described for extending drilling range by using additional detectors by moving a limited number of detectors. In another aspect, a system is provided including at least two above ground detectors for sensing the locating signal. The detectors are located at initial positions in the region. Electromagnetic data is generated by the detectors with the boring tool at multiple positions to generate electromagnetic data which is used to identify the positions of the detectors. A selected flux pathline steering technique is introduced.